

Practice Test

$$\begin{aligned}
 1) \quad 135^\circ \\
 &= 135^\circ \times \frac{\pi}{180^\circ} \\
 &= \frac{3\pi}{4}
 \end{aligned}$$

$$\begin{aligned}
 2) \quad \text{Many ways to answer} \\
 a = \frac{1}{3}C \quad \text{or} \quad a = \frac{1}{3}C \\
 = \frac{2\pi}{3}(3) \quad = \frac{1}{3}(2\pi r) \\
 = 2\pi \quad = \frac{2\pi(3)}{3} \\
 = 2\pi
 \end{aligned}$$

$$\begin{aligned}
 3) \quad \frac{11\pi}{6} \\
 &= \frac{11\pi}{6} \times \frac{180}{\pi} \\
 &= 330^\circ
 \end{aligned}$$

$$4) \cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

$$5) \sec\left(\frac{2\pi}{3} + x\right) = 2$$

$$\sec \theta = 2$$

$$\frac{1}{\cos \theta} = 2$$

$$\cos \theta$$

$$\cos \theta = \frac{1}{2}$$

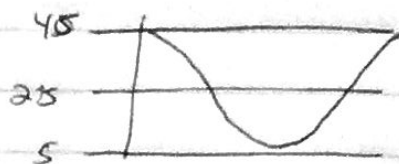
$$\theta = \pi/3 \text{ or } 5\pi/3$$

$$\therefore \frac{2\pi}{3} + x = \frac{\pi}{3} \text{ or } \frac{2\pi}{3} + x = \frac{5\pi}{3}$$

$$x = -\frac{\pi}{3}$$

$$x = \frac{3\pi}{3} = \pi$$

$$\begin{aligned}
 6) \quad \text{amp} &= 20 \\
 \text{period} &= 60s \quad K = \frac{2\pi}{60} \\
 \text{V.T.} &\uparrow 25
 \end{aligned}$$



(b)

7.) max: 115cm
min: 103cm

$$E_oA: \frac{\text{max} + \text{min}}{2}$$

$$= \frac{115 + 103}{2}$$

$$= \frac{218}{2}$$

$$= 109\text{cm}$$

$$= 1.09\text{m}$$

8.) max: 82
min: 76
period: 24hrs

$$\text{amp. } \frac{\text{max} - \text{min}}{2}$$

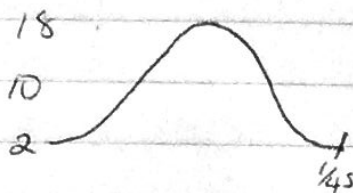
$$= 3$$

(A) or (C)

9.) Not on test.

10.) $\cos \theta = 3/4$
 $\theta = \cos^{-1}(3/4)$
 $= 0.723 \text{ or } 5.56$

11.) amp: 8cm
 $E_oA: 2 + 8 = 10$
period: 0.25s
 $K = \frac{2\pi}{0.25}$
 $= 8\pi$



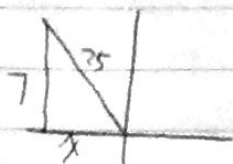
$$y = 8 \sin \left[8\pi \left(x - \frac{1}{45} \right) \right] + 10$$

$$12) \sin \theta = \frac{7}{25}$$

$$\cos \theta = \frac{x}{25}$$

$$= \frac{24}{25}$$

(not required)



$$x = \sqrt{25^2 - 7^2}$$

$$= 24$$

$$\cos 2\theta = 1 - 2\sin^2 \theta$$

$$= 1 - 2\left(\frac{7}{25}\right)^2$$

$$= 1 - \frac{98}{625}$$

$$= \frac{625 - 98}{625}$$

$$= \frac{527}{625}$$

$$13a) \sin \frac{5\pi}{4} = -\sin \frac{\pi}{4}$$

$$= -\frac{1}{\sqrt{2}}$$

$$= -\frac{\sqrt{2}}{2}$$

$$b) \cos \frac{11\pi}{6} = \cos \frac{\pi}{6}$$

$$= \frac{\sqrt{3}}{2}$$

$$c) \tan \frac{\pi}{8} = \tan \left(\frac{\pi}{4} - \frac{\pi}{8} \right)$$

$$= \frac{\tan \frac{\pi}{4} - \tan \frac{\pi}{8}}{1 + \tan \frac{\pi}{4} \tan \frac{\pi}{8}}$$

$$= \frac{1 - \tan \frac{\pi}{8}}{1 + \tan \frac{\pi}{8}}$$

$$\tan \frac{\pi}{8} + \tan^2 \frac{\pi}{8} = 1 - \tan \frac{\pi}{8}$$

$$\tan^2 \frac{\pi}{8} + 2\tan \frac{\pi}{8} - 1 = 0$$

$$\tan \frac{\pi}{8} = \frac{-2 \pm \sqrt{2^2 - 4(1)(-1)}}{2}$$

$$= \frac{-2 \pm \sqrt{8}}{2}$$

$$\Rightarrow \tan \frac{\pi}{8} = \frac{-2 \pm \sqrt{4}\sqrt{2}}{2}$$

$$= -1 \pm \sqrt{2}$$

$$13d) \csc \frac{7\pi}{12} = \frac{1}{\sin \frac{7\pi}{12}}$$

$$\begin{aligned}\sin \frac{7\pi}{12} &= \sin \left(\frac{4\pi}{12} + \frac{3\pi}{12} \right) \\ &= \sin \left(\frac{\pi}{3} + \frac{\pi}{4} \right) \\ &= \sin \frac{\pi}{3} \cos \frac{\pi}{4} + \sin \frac{\pi}{4} \cos \frac{\pi}{3}\end{aligned}$$

$$= \left(\frac{\sqrt{3}}{2} \right) \left(\frac{\sqrt{2}}{2} \right) + \left(\frac{\sqrt{2}}{2} \right) \left(\frac{1}{2} \right)$$

$$= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$$

$$= \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\begin{aligned}\therefore \csc \frac{7\pi}{12} &= \frac{4}{\sqrt{6} + \sqrt{2}} \\ &= \frac{4(\sqrt{6} - \sqrt{2})}{6 + 2} \\ &= \frac{1}{2}(\sqrt{6} - \sqrt{2})\end{aligned}$$

$$14a) 3\sin^2 x + 4\sin x - 9 = 3\sin^2 x - 8\sin x + 10$$

$$3\sin^2 x - 3\sin^2 x + 4\sin x + 8\sin x - 9 - 10 = 0$$

$$12\sin x - 19 = 0$$

$$\sin x = \frac{19}{12}$$

$x = \text{Not possible}$

$$14b) \sin^2 x = 1$$

$$\sin x = \pm 1$$

$$\sin x = \pm 1$$

$$x = \pi/2, 3\pi/2$$

$$14c) 10\sin^2 x + \sin x - 6 = -4$$

$$10\sin^2 x + \sin x - 2 = 0$$

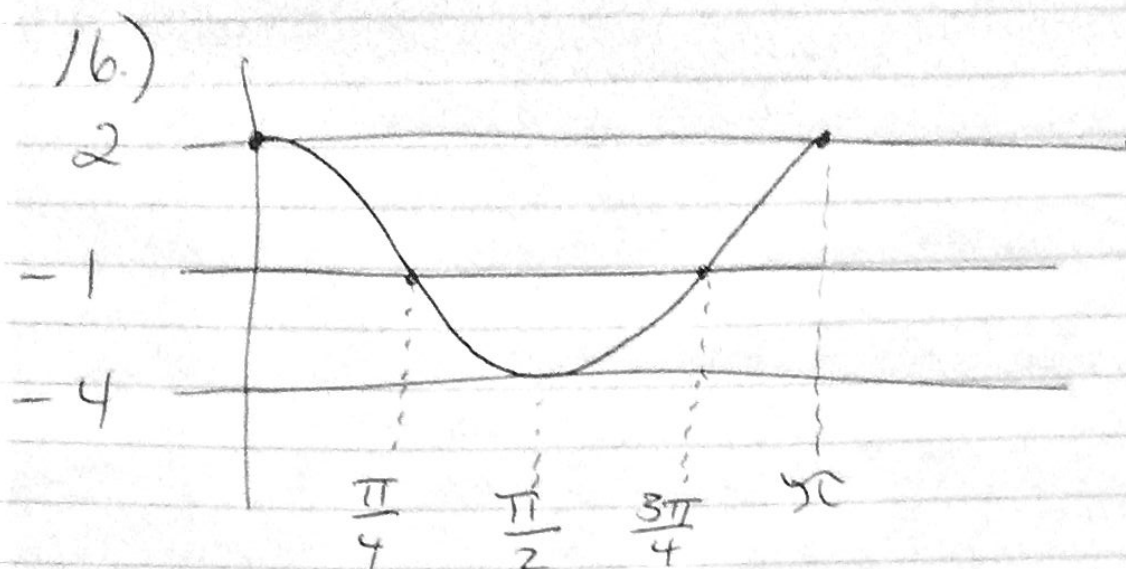
$$(2\sin x + 1)(5\sin x - 2) = 0$$

$$\sin x = -1/2 \quad \text{or} \quad \sin x = 2/5$$

$$x = \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$x = \sin^{-1}(2/5)$$

$$x = 0.412, 2.73$$



period: π amp: 3 phase shift: none